OUTLINE FOR SP-F1 PRESENTATION

1. Objectives
   - 1.1. Characterize the status of existing benthic macroinvertebrate (BMI) and plankton communities in the Oroville Project area.
   - 1.2. Evaluate current and potential future effects of the Oroville Facilities on the BMI and plankton communities.
     - 1.2.1. Based on a review of existing literature, describe typical effects of hydroelectric projects on environmental factors and how changes in these factors influence BMI and plankton communities.
     - 1.2.2. Describe current and potential future effects of the Oroville Facilities on environmental factors and assess their potential impacts on the BMI and plankton communities in the Project area.
2. Significance of BMI and Plankton
   - 2.1. BMI have major role in ecosystems as consumers of living and dead organic matter and as prey of most fishes.
   - 2.2. Plankton are primary producers of organic matter in lakes, ponds and many large rivers and are important prey of many fishes, especially when the fish are young.
   - 2.3. BMI and plankton communities are sensitive, temporally integrating indicators of environmental conditions.
3. Sampling Methods - BMI
   - 3.1. DWR Sampling
     - 3.1.1. Sampling conducted in the fall when flows were low and when most larval instars are older and thus larger and more easily identified.
     - 3.1.2. Sampled 21 riffles: 8 sites in tributaries upstream of Oroville Reservoir, 5 sites in the LFC, 7 sites in the HFC, 1 site in Glen Creek. Also sampled 6 deep-water riffle sites in the HFC.
     - 3.1.3. Riffle sampling locations selected and sampled using DFG's California Stream Bioassessment Procedure (CSBP).
   - 3.2. CSU-Chico Sampling
     - 3.2.1. Sampling conducted in January, April and July, 2002.
     - 3.2.2. Sampled 12 riffles: 4 sites in the main channel of the LFC, 4 sites in side channels of the LFC and 4 sites in the HFC.
     - 3.2.3. Sampling conducted with a modified Surber sampler using modification of the CSBP.

4. Sampling Methods – Plankton

4.1. Phytoplankton

4.1.1. Sampling conducted monthly.

4.1.2. Sampled 5 sites in Oroville Reservoir, 6 sites in Thermalito Complex impoundments and 3 sites in OWA ponds.

4.1.3. Plankton collected with plankton net from 30 feet to surface in Oroville Reservoir and from bottom to surface in other water bodies.

4.2. Zooplankton

4.2.1. Sampling conducted periodically during 2002 and 2003.

4.2.2. Sampled 5 sites in Oroville Reservoir and 1 site in Thermalito Afterbay.

4.2.3. Plankton collected with a plankton net from 30 feet to surface in Oroville Reservoir and from bottom to surface in other water bodies.

5. Analyses

5.1. BMI

5.1.1. BMI identified and enumerated by DFG approved labs using CSBP protocols.

5.1.2. Twenty CSPB BMI community metrics computed for each sampling station (Table 1) – (CSU no percent chironomids).

5.2. Plankton identified, enumerated and results tabulated by major taxonomic group.

5.3. Directional analysis used for evaluation of current and future Project effects.

5.3.1. The analysis relies on information about current and likely future Project operations and facilities, and their potential effects on BMI and plankton, as determined from literature review and professional judgment.

5.3.2. The analysis is semi-quantitative, using a five-point scale (strongly positive, positive, neutral, negative, strongly negative), to grade project effects.

6. Results – BMI (Tables 2 and 3)

   6.1. Diversity, as computed using the Shannon Diversity Index (SDI) or Cumulative Taxa, was lower at most stations in the lower Feather River than at the stations in tributaries upstream of Oroville Reservoir. The inundation zone of the South Fork Feather River had the lowest diversity of the stations upstream of the reservoir.

   6.2. Diversity was relatively uniform among riffle stations downstream of Oroville Dam. The station upstream of the Fish Hatchery, which was the most upstream station sampled in the lower Feather River, had the lowest SDI value.

   6.3. The SDI values of most sites were lower than those of sites on the mainstems of the Russian and Mokelumne Rivers, which were included in comprehensive CSPB monitoring programs of their basins. The site on the Russian River was described as impaired.

   6.4. Percentages of filterers and collectors were generally higher at stations in the lower Feather River than in the stations upstream of the Oroville Reservoir. These functional groups are expected in the greatest abundance below the dam due to the high amount of plankton and fine particulate organic matter produced in the reservoir.

   6.5. Seasonal differences – No obvious differences

   6.6. Main channel vs. Side-channel habitat – No obvious differences

7. Results – Plankton (Tables 4 & 5)

   7.1. Diatoms were the dominant taxonomic group in all water bodies except the OWA ponds, where green algae were dominant.

   7.2. Blue-greens made up less than 10% of the counts in all water bodies except the OWA ponds, where they were 16% of the counts.

   7.3. For zooplankton, no consistency in community structure, which may in part reflect inconsistent sampling regime – different stations sampled at different times of year.

8. Conclusions – Project Effects Evaluations

8.1. BMI – current (Table 6)

8.1.1. Positive effect: reduced flow fluctuations in LFC results in less flushing and stranding of BMI.

8.1.2. Negative effects: 1) armored substrates result in poor habitat, 2) lower summer water temperatures reduce rates of BMI development, 3) fish stocking results in increased predation on BMI.

8.1.3. No effects: 1) ramping flows and altered water temperatures downstream of Afterbay outlet.

8.2. BMI – future (Table 7)

8.2.1. Positive effects: 1) increased minimum flow in LFC creates more habitat area, 2) improved spawning gravels creates better habitat, 3) increased side-channel habitat.

8.2.2. Negative effects: 1) lower summer water temperatures reduce rates of BMI development, 2) fish stocking results in increased predation on BMI.

8.3. Plankton – current (Table 8)

8.3.1. Negative effect: increased abundance of warmwater species due to habitat enhancements in Oroville Reservoir results in greater fish predation.

8.4. Plankton – future (Table 9)

8.4.1. Positive effects: 1) increased pool habitat in side-channel areas, 2) reduced aquatic plants in OWA ponds leads to increased visibility of and predation on planktivorous fishes.